NASA Policy Directive

NPD 8610.7C
Effective Date: April 05, 2005
Expiration Date: April 05, 2010

COMPLIANCE IS MANDATORY

Printable Format (PDF)

Subject: Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions

Responsible Office: Space Operations Mission Directorate

1. POLICY

a. NASA's Mixed-Fleet Launch Strategy seeks to utilize both existing and emerging domestic launch capability to assure access to space for NASA payloads (spacecraft, instruments, etc.) and their related missions. This directive addresses the process that enables NASA to take advantage of the full range of available launch capability while ensuring that the risks associated with access to space are consistent with the risk classification approved for individual payloads and missions. This directive complies with the requirement for Program Risk Management documented in NPR 7120.5.

b. Consistent with the United States (U.S.) Space Transportation Policy direction, U.S. Government payloads will be launched on launch vehicles manufactured in the U.S., unless exempted by the Director of the Office of Science and Technology Policy and/or as part of an approved international cooperative mission with launch contributed on a no funds exchanged basis.

c. NASA launch vehicle assignment and acquisition strategy seek to balance launch risk for individual missions with launch vehicle demonstrated flight history, maturity, and NASA technical penetration consistent with overall mission risk. Launch vehicle mission risk classification and launch vehicle certification strategy will be reviewed and documented through the NASA Flight Planning Board for each NASA mission launch contract award.

d. This policy addresses three levels of launch vehicle risk: high, medium, and low. NASA's approach to mitigate these launch vehicle risks is through a launch vehicle certification process, which is summarized below and identifies the requirements to obtain certification described in greater detail in the Attachment to this policy:

(1) A "common launch vehicle configuration" is defined as a unique combination of core propulsive stages, excluding strap-on rocket motors and stages explicitly for orbit escape or trim. This policy addresses the certification of three types of launch capabilities: (a) a common launch vehicle configuration with an extensive successful flight history (14 or more consecutive successful flights), (b) a new common launch vehicle configuration from an evolved vehicle family (i.e., a group of related expendable launch vehicles that have undergone a process of change from a simpler to a more complex state) provided by a launch services contractor (LSC) organization with an already NASA-certified launch system, and/or (c) a new common launch vehicle configuration provided by an emerging LSC.
NASA's launch vehicle insight and approval practices (NPD 8610.23) have enabled the NASA Launch Services Program (LSP) to gain a broad technical knowledge of existing certified launch systems. This permits the application of a rigorous and targeted technical penetration to identify and mitigate residual technical risks for a new common launch vehicle configuration that is from an evolved vehicle family produced by a LSC with a previously certified launch system, in lieu of requiring a greater demonstrated flight history.

(2) Payloads which are classified as Class D payloads pursuant to NPR 8705.4 may be launched on Risk Category 1 launch vehicles (i.e., a new common launch vehicle configuration with no prior demonstrated flight history following completion of the NASA audits and evaluation of documentation specified in the Attachment).

(3) Payloads which are classified as Class C payloads and in some cases Class B payloads, pursuant to NPR 8705.4, may be launched on Risk Category 2 launch vehicles that have demonstrated a limited history of successful flights. Accordingly, Class C payloads, and in some cases Class B payloads, may launch on a common launch vehicle configuration that has been certified by either of two alternative methods:

(a) Alternative 1 provides for certification after one (1) successful flight of a common launch vehicle configuration following completion of the NASA audits and evaluation of documentation specified in the Attachment, or

(b) Alternative 2 provides for certification after three (3) consecutive successful flights of a common launch vehicle configuration developed by an LSC for whom NASA has previously completed a vehicle category 2 or 3 certification, following completion of a NASA Design Certification Review and the evaluation of limited additional documentation specified in the Attachment.

(4) Payloads which are classified as Class A, and in some cases Class B payloads pursuant to NPR 8705.4, must be launched on Risk Category 3 launch vehicles that have a more robust demonstrated consecutive successful flight history. Accordingly, payloads classified as Class A, and in some cases Class B payloads, may launch on a common launch vehicle configuration that has been certified by any of three alternative methods:

(a) Alternative 1 provides for certification of a common launch vehicle configuration with a demonstrated flight record of a series of 14 consecutive successful flights of a common launch vehicle configuration (i.e., 95 percent demonstrated reliability at 50 percent confidence level), following completion of NASA evaluation of the limited additional documentation specified in the Attachment.

(b) Alternative 2 provides for certification after six (6) successful flights (that includes a minimum of three (3) consecutive successful flights) of a common launch vehicle configuration from an evolved vehicle family developed by an LSC who has previously developed a launch vehicle that was certified as Risk Category 3 by NASA, following completion of a NASA Design Certification Review and the limited additional documentation specified in the Attachment.

(c) Alternative 3 provides for certification after three (3) consecutive successful flights of a common launch vehicle configuration from an evolved vehicle family developed by an LSC who has previously developed a launch vehicle that was certified as Risk Category 3 by NASA, following completion of the audits and documentation specified for Alternatives 1 and 2, and with the addition of more extensive technical penetration, as specified in the Attachment.

(5) For all flight histories used to support Risk Category 2 and 3 certification of a common launch vehicle configuration, LSP verification that the common launch vehicle configuration met the predicted vehicle and performance parameters (e.g., within three-sigma criteria) is required (Flight Margin Verification). A common launch vehicle configuration failure caused by a part or subsystem that has sufficient previous flight history does not automatically invalidate the consecutive success requirement. LSP-PLN-324.01, "Expendable Launch Vehicle Certification Plan" will identify criteria/process for review of this condition.

(6) This policy does not preclude a decision to utilize a lower risk launch vehicle for any payload. A payload defined as a Class D payload pursuant to NPR 8705.4 may utilize a common launch vehicle configuration certified to a Risk Category 2 or 3. A payload defined as a Class C or D payload pursuant to NPR 8705.4 may utilize a common launch vehicle configuration certified to Risk Category 3.

(7) An on-orbit payload delivery services contract will be considered on a case-by-case basis by the payload Mission Directorate and the Office of Space Operations (OSO). NASA will pursue a similar risk assessment strategy whereby the vehicle's demonstrated flight history and maturity will be consistent with the overall mission risk. Flight Planning Board review and concurrence is required prior to initiation of any on-orbit service acquisition.

(8) In considering whether to enter into a particular cooperative mission involving the launch of a NASA-owned or NASA-sponsored payload on a foreign launch vehicle, NASA will pursue a similar risk assessment strategy, balancing payload mission criticality with launch vehicle maturity and flight history. Flight Planning Board review and concurrence is required prior to initiation of the formal interagency coordination process required under the U.S. Space Transportation Policy. The OSO will coordinate any proposed international cooperative on a foreign launch system with the sponsoring Mission Directorate and the Office of External Relations.

(9) Each NASA launch services contract shall include a provision that requires the LSC to support the launch vehicle certification requirements set forth in this policy and enables NASA insight, consistent with NPD 8610.23, into the LSC's and LSC's subcontractors' systems engineering, processes, and process control to ensure the quality and reliability of the launch services and consistency with this policy.

(10) In considering use of a Department of Defense-provided launch of a NASA-owned or NASA-sponsored payload, NASA will evaluate the risk using a similar assessment strategy, balancing payload mission criticality with launch vehicle maturity and flight history, and NASA's ability to obtain technical knowledge of the launch vehicle. Flight Planning Board review and concurrence is required prior to initiation of the formal interagency coordination process.

2. APPLICABILITY

a. This policy applies to all NASA-owned or NASA-sponsored payloads/missions using NASA funding for purchase of launch services and/or for other Government-sponsored payloads for which NASA is responsible for launch service acquisition and management.

b. This policy is not applicable to payloads launched on the Space Shuttle.

3. AUTHORITY

a. 42 U.S.C. 2473(c)(1), Section 203(c)(1) of the National Aeronautics and Space Act of 1958, as amended.

b. 10 U.S.C. Section 2319 et seq., Section 1216 of the "Department of Defense Authorization Act of 1985" as amended.

4. REFERENCES

a. 42 U.S.C. Section 14731 et seq., Section 201 of the "Commercial Space Act of 1998" (P.L. 105-303), as amended.

b. 42 U.S.C. Section 14732 et seq., Section 202 of the "Commercial Space Act of 1998" (P.L. 105-303), as amended.

c. 42 U.S.C. Section 2459c et seq., Section 311 of the NASA Authorization Act of 1988" (P.L. 100-147), as amended.

d. NPD 8610.23, Technical Oversight of Expendable Launch Vehicle (ELV) Launch Services.

e. NPR 7120.5, NASA Program and Project Management Processes and Requirements.

f. NPR 8705.4, Risk Classification for NASA Payloads.

g. NASA HOWI8682 - M012, "Expendable Launch Vehicle (ELV) Manifest Process."

5. RESPONSIBILITY

a. The Assistant Associate Administrator for Launch Services, as delegated by the Associate Administrator for Space Operations, is responsible for the following:

(1) Conducting Special Flight Planning Board meetings, as required, to review and approve launch vehicle risk assignments to ensure compliance with this directive with regard to identification of launch vehicle risk category and sponsoring Mission Directorate payload classification, proposed vehicle certification strategy, and vehicle flight assignment for individual missions.

(2) Approving and tailoring, as appropriate, launch vehicle certification requirements consistent with this policy for individual missions, prior to award of a launch contract, in coordination with the Chief Engineer, the Office of Safety and Mission Assurance, and the sponsoring Mission Directorate at mission-specific Flight Planning Boards.

(3) Ensuring the enforcement of this policy directive.

(4) Coordinating any requisite exemption request to the U.S. Space Transportation Policy directive requiring U.S. Government payloads to be flown on launch vehicles manufactured in the U.S.

(5) Developing alternative risk mitigation strategies, as required for unique missions on a case-by-case basis, which are reviewed and approved by the Flight Planning Board.

b. Each Mission Directorate Associate Administrator is responsible for:

(1) Ensuring that all respective spacecraft Announcements of Opportunity and Requests for Proposal are coordinated with the OSO for consistency with this policy prior to publication.

(2) Determining and coordinating payload mission classification consistent with NPR 8705.4.

(3) Serving as a member of the Flight Planning Board responsible for coordination and concurrence on launch vehicle risk assignment and certification requirements for individual missions.

c. The LSP Manager is responsible for:

(1) Defining and implementing launch vehicle certification requirements consistent with this policy.

(2) Identifying to the Flight Planning Board any major modifications to a certified launch vehicle configuration that does not require recertification, but may warrant additional review and/or technical penetration.

(3) Ensuring that all launch services solicitations for NASA-owned or NASA-sponsored payloads are consistent with this policy and coordinated with OSO prior to release.

(4) Implementing changes to the launch vehicle certification requirements, as approved and directed by the Flight Planning Board.

(5) Providing, in accordance with NPR 7120.5, for the safety and mission success of the launch portion of any payload mission utilizing launch services acquired and managed by LSP and governed by this policy.

d. Mission Directorates, Center Directors, and the Director of the Jet Propulsion Laboratory are responsible for ensuring that all NASA-owned or NASA-sponsored payloads under their control obtain launch services provided by the LSP that are consistent with this policy and are coordinated with OSO.

6. DELEGATION OF AUTHORITY

None.

7. MEASUREMENTS

a. The Space Operations Mission Directorate will maintain a record of launch vehicle flight history and reliability statistics for all U.S. and foreign launch vehicle suppliers.

8. CANCELLATION

NPD 8610.7A, dated February 4, 1999.

/s/ Frederick D. Gregory
Acting Administrator

ATTACHMENT A: (TEXT)

(URL for Graphic)

NASA Launch Vehicle Certification Requirements Matrix

DISTRIBUTION:
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